

Ser. No. 09/857,859
Response to Office Action of 18 July 2003
Atty Docket 117040-30

REMARKS

Claims 1-14 were pending in the application at the time of the Office Action. Of these, claims 1, 8, 12 and 14 are amended and claims 2, 3, 9 and 10 are cancelled. New dependent claim 15 is introduced.

The amendments to claim 1 are of three types. First, the claim has been amended in a non-narrowing manner to put the claim into more correct US form, that is, by positively reciting in gerund form the verbs indicating the steps being taken and by providing proper antecedent basis. The second type of amendment is to incorporate the limitations of claims 2 and 3 into claim 1, which is admittedly a narrowing of the scope of claim 1. The third type of amendment is found at line 8, where an optional step ("where an interposed buffer layer can be deposited") has been removed, which is non-narrowing and may actually be considered a broadening amendment. Accordingly, claims 2 and 3 are cancelled.

Similarly, claim 8 has been amended in a manner similar to claim 1, with the limitations of claims 9 and 10 being incorporated into claim 8. Accordingly, claims 9 and 10 are cancelled.

Claims 12 and 14 are also amended in a narrowing fashion to incorporate the effective content of claims 2 and 3 or 9 and 10, respectively, into them, but there are no equivalent dependent claims of these independent claims to cancel.

As a result of these amendments, the Examiner's rejections under 35 U.S.C. 112, second paragraph, are being to be successfully overcome.

New dependent claim 15 presents the limitation removed from claim 8 as a dependent claim, and it is believed to be allowable as a claim properly dependent from claim 8.

Section 102 rejections

In the current Office action, claims 1, 8, 12-14 are rejected under 35 U.S.C. 102 (e) as being anticipated by US Patent No. 6,020,246 to Koscielniak ("Koscielniak '246"). Applicant traverses this rejection. Because of the structure of the claims after amendment, the allowability of all of the independent claims can be argued together.

Scr. No. 09/857,859
Response to Office Action of 18 July 2003
Atty Docket 117040-30

Koscielniak '246 describes a transistor with a p-type layer 205-2 atop an n-type layer 205-1. Layer 205-2 has an optional impurity dopant concentration ranging from about $2 \times 10^{18} \text{ cm}^{-3}$ at an upper surface to a concentration of about $1 \times 10^{17} \text{ cm}^{-3}$ at a lower surface. Col. 5, lines 37-54. Koscielniak '246 does not teach having an upper concentration limit of $5 \times 10^{16} \text{ cm}^{-3}$ in a region of from 20 to 70 nm extending from the lower surface of layer 205-2 towards the upper surface, as is now claimed in independent claims 1, 8, 12 and 14. The Koscielniak '246 concentration limit of $1 \times 10^{17} \text{ cm}^{-3}$ is reached at the lower surface, showing that a region of this lower concentration is not provided. By way of contrast, the claims in the amended application require that a low-doped region in the cap layer, having a thickness in the range of 20 to 70 nm, is provided. The specification as filed indicates that this feature is "decisive for the good high-frequency properties" of the product.

For at least these reasons, the independent claims 1, 8, 12 and 14 are not anticipated by Koscielniak '246, and allowance of them is earnestly requested. Since claims 4-7, 11 and 13 are proper dependent claims of allowable independent claims, they are likewise allowable.

Section 103 rejections

The Examiner has rejected claims 2-7 and 9-11 are rejected under 35 U.S.C. 103(a) as being obvious over Koscielniak '246. The rejections of claims 2, 3, 9 and 10 are mooted by the cancellation of the claims. Claims 4-7 and 11 (as well as 13) have already been indicated as being allowable for the reason that they are proper dependent claims of allowable independent claims.

The applicant would make some comments on the obviousness rejections, however. First, the Examiner has referred to the ephemeral knowledge that "would have been obvious to one of ordinary skill in the art at the time the invention was made" without substantiating either the source of such knowledge or the level of ordinary skill in this art, rendering a reasoned response somewhat difficult. Second, the applicant would like to address why even the independent claims in this case are not obvious over Koscielniak '246, recognizing that the Examiner has not made such a rejection.

The present solution is not obvious over Koscielniak '246 because the introductory portion of the specification describes the prior art related to high-frequency transistors, and the

Ser. No. 09/857,859
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Atty Docket 117040-30

documents described there demonstrate the failure of the prior art to make the present solution obvious, even to persons of greater than ordinary skill in that art.

The low-doped base side section of the cap layer taught by the present invention with a maximum doping concentration of $5 \times 10^{16} \text{ cm}^{-3}$ can be considered a separate layer on its own, when compared to the teaching of Koscielniak '246. Designing this particular doping profile for the cap layer to achieve good high-frequency operation of a bi-polar transistor was clearly an unsolved problem before the present invention.

Accordingly, the independent claims 1, 8, 12 and 14, after the amendments made above are not only not anticipated by Koscielniak '246, but they are also not obvious.

In view of the foregoing, it is respectfully submitted that the pending claims define allowable subject matter. A favorable action on the merits is respectfully requested.

Should anything remain in order to place the present application in condition for allowance, the Examiner is kindly invited to contact the undersigned at the telephone listed below.

While the undersigned attorney is now resident in the Columbus, Ohio, office of Hahn Loeser + Parks LLP and may be reached by telephone there at 614-233-5104, the Examiner is requested to direct any written correspondence to the Akron, Ohio office at the address indicated below.

Respectfully submitted,



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